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EXAMINER	
RALEIGH, DONALD L	

ART UNIT	PAPER NUMBER
2879	

NOTIFICATION DATE	DELIVERY MODE
11/10/2008	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

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Office Action Summary	Application No.	Applicant(s)	
	10/588,233	MATSUURA ET AL.	
	Examiner	Art Unit	
	DONALD L. RALEIGH	2879	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *08 August 2008*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-12* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-5 and 7-12* is/are rejected.

7)☒ Claim(s) *6* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Response to Amendment

The Amendment, filed on August 8, 2008 has been entered and acknowledged by the Examiner.

The addition of new Claims 8-12 has been entered.

Claims 1-12 are pending in the instant application.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 1-4 and 8-12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Adachi et al (US PG Pub. No. 2002/0113545) in view of Shiang et al (US PG Pub. No. 2005/0260439) and further in view of Forrest et al (US Patent No. 7,061,011).

Regarding Claim 1, Adachi discloses, at least in Figure 6, an organic electroluminescent device (abstract line1 (OLED)) having a structure in which at least an emitting layer (613) and an electron-transporting layer (613)(Paragraph [0033] lines 5-6 teaches that the electron transport layer also functions as an emitting layer. Also, see Figure 1, Device II and Paragraph [0056] which shows separate layers (EML and ETL) are stacked between an anode (611) and a cathode (614)(see Figure 6) , the emitting layer containing an organic metal complex (Paragraph 0004], lines 9-10) .

Adachi discloses wherein a difference (ΔAF) in electron affinity between a main organic material forming the emitting layer and a main material forming the electron-transporting layer satisfies the following expression; "0.2 eV ≤ ΔAF ≤ 0.65 eV" (Paragraph [0028], lines 7-9 (no more than 0.5ev)).

Furthermore, Forrest teaches in Column 1, lines 25-26 using an OLED . Also, in Column 6, lines 53-55, Forrest teaches an emissive layer (135) that may include an organic material capable of emitting light. Furthermore, Column 6, lines 59-62 teaches that it may, in addition, contain electron transport material. Column 2, lines 32-35 teaches that the electron affinity between the two organic materials should be within 0.4 eV and preferably within about 0.2 eV which places it in the required range to create a material in which it is likely that electrons will move from one material to the other (Column 3, lines 31-33).

It would have been obvious to one of ordinary skill in the art, at the time the invention was made, to use material in the emitting layer with the electron affinities, as taught by Forrest, in the device of Adachi in replace of Adachi's material, or to use Adachi's materials alone in the two layers, disclosed by Adachi, to create a material in which it is likely that electrons will move from one material to the other.

Adachi discloses that a heavy metal is used as a central metal (Paragraph [0045], lines 1-2 ((Ir(ppy):CBP)(Iridium is the heavy metal).

In addition, Shiang also teaches in Paragraph [0043] lines 1-7 using a heavy metal in the organic emitting materials to allow for more efficient transfer and harvest of the triplet energy state.

It would have been obvious to one of ordinary skill in the art, at the time of the invention, to substitute the heavy metal complex as taught by Shiang into the OLED of Adachi, as modified by Forrest, to allow for more efficient transfer and harvest of the triplet energy state or to use the heavy metal complex taught by Adachi in the two layers of Adachi.

Regarding Claim 2, Adachi, as modified by Forrest, fails to exemplify the organic electroluminescent device which emits electroluminescence at a longer wavelength than the wavelength corresponding to the triplet energy gap (Eg^T(Dopant)) of the organic metal complex having a heavy metal as a central metal.

In the same field of endeavor, Shiang teaches in Paragraph [0043], lines 1-7 using a heavy metal in the organic emission materials. Also, Shiang teaches that the emissions of the organic materials are in the red emitting region (long wavelengths) and that the emissions with the heavy metal doping will include emissions from the triplet state in order to allow for more efficient transfer and harvest of the blue emitting material. (blue light range, triplet energy range = shorter wavelength).

It would have been obvious to one of ordinary skill in the art, at the time of the invention, to incorporate the heavy metal as taught by Shiang into the shorter wavelength material of the electroluminescent layer of Adachi, as modified by Forrest, in order to allow for more efficient transfer and harvest of the triplet energy state of the blue emitting material.

Regarding Claim 3, Adachi, as modified by Forrest, fails to exemplify an organic electroluminescent device wherein the electroluminescence at a longer wavelength than the wavelength corresponding to the triplet energy gap (Eg^T(Dopant)) of the organic metal complex having a heavy metal as a central metal is a main component of electroluminescence emitted from the device.

Shiang teaches in Paragraph [0043], lines 1-7 that the organic material of the emission layer is red emitting (longer wavelength) indicating that the red emitting material is the main component of electroluminescence and further that the doping of heavy metal (triplet energy dopant) is only 200 parts per million, indicating that it is a minor component of the electroluminescent material.

Furthermore, Shiang uses this combination to allow for more efficient transfer and harvest of the triplet state energy of the blue emitting material.

It would have been obvious to one of ordinary skill in the art, at the time of the invention, to incorporate the components as taught by Shiang into the device of Adachi, as modified by Forrest, to allow for more efficient transfer and harvest of the triplet state energy of the blue emitting material.

Regarding Claim 4, Adachi discloses, at least in Figure 6, the organic electroluminescent device wherein the main organic material forming the emitting layer has an electron transporting property.(Paragraph [0033], lines 5-6).

Regarding Claim 8, Adachi discloses the organic electroluminescent device wherein the difference (ΔAF) in electron affinity between a main organic material

forming the emitting layer and a main material forming the electron-transporting layer satisfies the following expression; "0.47 eV AAF 0.65 eV" (Paragraph [0028], lines 7-9 (no more than 0.5ev)).

Regarding Claim 9, Adachi discloses the organic electroluminescent device wherein the organic metal complex (Paragraph [0045], lines 1-2 ((Ir(ppy):CBP) having at least a heavy metal (Iridium) is a heavy metal organic complex (the CBP is organic) , triplet energy state.

Regarding Claim 10, Adachi discloses in Paragraph [0045], lines 1-2, the organic electroluminescent device (Paragraph [0018], line 1) wherein the concentration of the heavy metal (Iridium) organic (CBP) complex (Ir(ppy)):CBP) in the emitting layer is 0.1 to 20 mass% (7%).

Regarding Claim 11, Adachi discloses in Figure 1 (Device II) the organic electroluminescent device having a structure in which at least an emitting layer (EML) and an electron-transporting layer (ETL) are stacked between an anode (ITO) and a cathode (MgAg) in the following configuration: (2) anode/hole-transporting layer/emitting layer/electron-transporting layer/cathode (see Figure 1 (Device II)).

Regarding Claim 12, Adachi discloses the organic electroluminescent device wherein the heavy metal organic complex in the emitting layer has a triplet energy gap (Egr(Dopant)) of 2.5 eV or more and 3.5 eV or less (Figure 1, (Ir(ppy)3), 3.0 eV).

Claims 5 and 7 are rejected under 35 U.S.C. 103(a) as being unpatentable over Adachi in view of Forrest and Shiang and further in view of Kondakova et al (US PG Pub. No. 2005/0123797).

Regarding Claim 5, Adachi, as modified by Forrest, fails to exemplify an organic electroluminescent device wherein the triplet energy gap (Eg^T(Host)) of the main organic material forming the emitting layer is 2.52 eV or more.

In the same field of endeavor, Shiang teaches in Paragraph [0029], lines 1-12, an organic EL layer (line 1) that electroluminesces either in the blue or red region. (line 12).

Furthermore, Kondakova teaches in Column 7, lines 8-9 that the triplet energy of a blue phosphorescent material can be as low as 2.8 eV (i.e. more than 2.52 eV).

It would have been obvious to one of ordinary skill in the art, at the time of the invention, to incorporate the organic layer as taught by Shiang into the device of Adachi, as modified by Forrest, in order to emit blue light which Kondakova teaches inherently has a triplet energy of more than 2.52 eV.

Regarding Claim 7, Adachi, as modified by Shiang and Forrest, fails to exemplify the organic electroluminescent device wherein the triplet energy gap (Eg^T(Host)) of the main organic material forming the emitting layer is equal to or greater the triplet energy gap (Eg^T(Dopant)) of the organic metal complex having a heavy metal as a central metal.

In the same field of endeavor, Kondakova teaches in Paragraph [0014], lines 1-8, an electroluminescent device (line 1) wherein the triplet energy gap of the main organic material (phosphorescent guest material, line 7) is more than the triplet energy gap of the organic metal complex (efficiency enhancing material).(Paragraph [0015], lines 4-7 teaches that the light emitting layer includes an organometallic compound including a heavy metal (platinum or iridium)) in order to provide a light source having two different wavelength ranges (Paragraph [0021], lines 1-3).

It would have been obvious to one of ordinary skill in the art, at the time of the invention, to incorporate the energy gap differences as taught by Kondakova into the OLED device of Adachi, as modified by Shiang and Forrest, in order to provide a light source having two different wavelength ranges.

Allowable Subject Matter

Claim 6 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

The following is an examiner's statement of reasons for allowance.

Regarding Claim 6, the references of the Prior Art of record fails to teach or suggest the combination of the limitations as set fourth in Claim 6, and specifically comprising the limitation of an " organic electroluminescent device wherein the triplet energy gap (Eg^T(Dopant)) of the organic metal complex having a heavy metal as a

central metal is equal to or greater than the triplet energy gap (Eg^T(ETL)) of the main material forming the electron-transporting layer."

Furthermore, prior art of record teaches the reverse of applicant's claim, that the triplet energy gap of the host (ETL) should be more than the triplet energy gap of the dopant , in order to have an efficient transfer of electrons from host to dopant.

Response to Arguments

Applicant's arguments filed August 8, 2008 have been fully considered but they are not persuasive.

After further review of the prior art of Adachi, it is found that Adachi also teaches a protection layer (15) and a heavy metal organic complex (Ir(ppy):CBP).

Applicant's argument with regards to Claim 1, that Adachi does not teach a separate emission layer and electron transport layer is not correct.

Figure 1, Device II of Adachi clearly shows that separate layers already are known in the prior art. Also, see Paragraph [0056] where Adachi utilizes this configuration.

Applicant's argument with regards to claim 1 that Adachi does not teach an organic metal complex is incorrect. Adachi uses (Ir(ppy):CBP) in the emission layer : Iridium is a heavy metal and CBP is an organic compound. Applicant also uses Ir(ppy) as a dopant in the specification, paragraph [0064], line 2.

Conclusion

THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to DONALD L. RALEIGH whose telephone number is (571)270-3407. The examiner can normally be reached on Monday-Friday 7:30AM to 5:00PM EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nimesh Patel can be reached on 571-272-2457. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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